measuring hydrocarbons when testing with oxygenated fuels.

(b) *Component requirements.* We recommend that you use a FID analyzer that meets the specifications in Table 1 of §1065.205. Note that your FID-based system for measuring THC, THCE, or CH_4 must meet all of the verifications for hydrocarbon measurement in subpart D of this part, and it must also meet the linearity verification in §1065.307. You may use a FID that has compensation algorithms that are functions of other gaseous measurements and the engine's known or assumed fuel properties. The target value for any compensation algorithm is 0.0% (that is, no bias high and no bias low), regardless of the uncompensated signal's bias.

(c) *Heated FID analyzers.* For diesel-fueled engines, two-stroke spark-ignition engines, and four-stroke spark-ignition engines below 19 kW, you must use heated FID analyzers that maintain all surfaces that are exposed to emissions at a temperature of (191 ±11) °C.

(d) *FID fuel and burner air.* Use FID fuel and burner air that meet the specifications of §1065.750. Do not allow the FID fuel and burner air to mix before entering the FID analyzer to ensure that the FID analyzer operates with a diffusion flame and not a premixed flame.

(e) *Methane.* FID analyzers measure total hydrocarbons (THC). To determine nonmethane hydrocarbons (NMHC), quantify methane, CH_4, either with a nonmethane cutter and a FID analyzer as described in §1065.265, or with a gas chromatograph as described in §1065.267. Instead of measuring methane, you may assume that 2% of measured total hydrocarbons is methane, as described in §1065.660. For a FID analyzer used to determine NMHC, determine its response factor to CH_4, RF_{CH4}, as described in §1065.360. Note that NMHC-related calculations are described in §1065.660.

§1065.265 Nonmethane cutter.

(a) *Application.* You may use a nonmethane cutter to measure CH_4 with a FID analyzer. A nonmethane cutter oxidizes all nonmethane hydrocarbons to CO_2 and H_2O. You may use a nonmethane cutter for raw or diluted exhaust for batch or continuous sampling.

(b) *System performance.* Determine nonmethane-cutter performance as described in §1065.365 and use the results to calculate NMHC emission in §1065.660.

(c) *Configuration.* Configure the nonmethane cutter with a bypass line for the verification described in §1065.365.

(d) *Optimization.* You may optimize a nonmethane cutter to maximize the penetration of CH_4 and the oxidation of all other hydrocarbons. You may humidify a sample and you may dilute a sample with purified air or oxygen (O_2) upstream of the nonmethane cutter to optimize its performance. You must account for any sample humidification and dilution in emission calculations.

EFFECTIVE DATE NOTE: At 73 FR 37300, June 30, 2008, §1065.265 was amended by revising paragraph (c), effective July 7, 2008. For the convenience of the user, the revised text is set forth as follows:

§1065.265 Nonmethane cutter.

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(c) *Configuration.* Configure the nonmethane cutter with a bypass line if it is needed for the verification described in §1065.365.

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§1065.267 Gas chromatograph.

(a) *Application.* You may use a gas chromatograph to measure CH_4 concentrations of diluted exhaust for batch sampling. While you may also use a nonmethane cutter to measure CH_4, as described in §1065.265, use a reference procedure based on a gas chromatograph for comparison with any proposed alternate measurement procedure under §1065.10.

(b) *Component requirements.* We recommend that you use a gas chromatograph that meets the specifications in Table 1 of §1065.205, and it must also meet the linearity verification in §1065.307.

NO_X MEASUREMENTS

§ 1065.270 Chemiluminescent detector.

(a) *Application.* You may use a chemiluminescent detector (CLD) to measure NO_X concentration in raw or diluted exhaust for batch or continuous sampling. We generally accept a CLD for NO_X measurement, even though it measures only NO and NO_2, when coupled with an NO_2-to-NO converter, since conventional engines and aftertreatment systems do not emit significant amounts of NO_X species other than NO and NO_2. Measure other NO_X species if required by the standard-setting part. While you may also use other instruments to measure NO_X, as described in §1065.272, use a reference procedure based on a chemiluminescent detector for comparison with any proposed alternate measurement procedure under §1065.10.

(b) *Component requirements.* We recommend that you use a CLD that meets the specifications in Table 1 of §1065.205. Note that your CLD-based system must meet the quench verification in §1065.370 and it must also meet the linearity verification in §1065.307. You may use a heated or unheated CLD, and you may use a CLD that operates at atmospheric pressure or under a vacuum. You may use a CLD that has compensation algorithms that are functions of other gaseous measurements and the engine's known or assumed fuel properties. The target value for any compensation algorithm is 0.0% (that is, no bias high and no bias low), regardless of the uncompensated signal's bias.

(c) *NO_2-to-NO converter.* Place upstream of the CLD an internal or external NO_2-to-NO converter that meets the verification in §1065.378. Configure the converter with a bypass to facilitate this verification.

(d) *Humidity effects.* You must maintain all CLD temperatures to prevent aqueous condensation. To remove humidity from a sample upstream of a CLD, use one of the following configurations:

(1) Connect a CLD downstream of any dryer or chiller that is downstream of an NO_2-to-NO converter that meets the verification in §1065.378.

(2) Connect a CLD downstream of any dryer or thermal chiller that meets the verification in §1065.376.

(e) *Response time.* You may use a heated CLD to improve CLD response time.

EFFECTIVE DATE NOTE: At 73 FR 37300, June 30, 2008, §1065.270 was amended by revising paragraphs (c) and (d) introductory text, effective July 7, 2008. For the convenience of the user, the revised text is set forth as follows:

§ 1065.270 Chemiluminescent detector.

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(c) *NO_2-to-NO converter.* Place upstream of the CLD an internal or external NO_2-to-NO converter that meets the verification in §1065.378. Configure the converter with a bypass line if it is needed to facilitate this verification.

(d) *Humidity effects.* You must maintain all CLD temperatures to prevent aqueous condensation. If you remove humidity from a sample upstream of a CLD, use one of the following configurations:

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§ 1065.272 Nondispersive ultraviolet analyzer.

(a) *Application.* You may use a nondispersive ultraviolet (NDUV) analyzer to measure NO_X concentration in raw or diluted exhaust for batch or continuous sampling. We generally accept an NDUV for NO_X measurement, even though it measures only NO and NO_2, since conventional engines and aftertreatment systems do not emit significant amounts of other NO_X species. Measure other NO_X species if required by the standard-setting part.

(b) *Component requirements.* We recommend that you use an NDUV analyzer that meets the specifications in Table 1 of §1065.205. Note that your NDUV-based system must meet the verifications in §1065.372 and it must also meet the linearity verification in §1065.307. You may use a NDUV analyzer that has compensation algorithms that are functions of other gaseous measurements and the engine's known or assumed fuel properties. The target value for any compensation algorithm is 0.0% (that is, no bias high and no bias low), regardless of the uncompensated signal's bias.